

I CLAIM:

1. A method for removing free zinc particulate from galvanizing skimmings, recovering the free zinc and producing a refined ash by-product during operating of a hot dip galvanizing system, comprising:

depositing galvanizing skimmings from a galvanizing kettle in a first chamber of a galvanizing skimmings processor having a processor housing having a substantially closed second chamber separated from said first chamber and having an open bottom immersed within the molten zinc of the galvanizing kettle and thus having molten zinc within said second chamber;

with a skimmings conveyor transporting the galvanizing skimmings from said first chamber to said second chamber;

agitating the galvanizing skimmings in the molten zinc of the second chamber and causing melting of free zinc within the molten zinc and yielding processed ash; and

removing the processed ash by-product from said second chamber.

2. The method of claim 1, wherein a partition separates said first and second chambers and a conveyor passage is defined through said partition and said skimmings conveyor being driven by a skimmings conveyor motor and having portions of said skimmings conveyor located within said first chamber and within said conveyor passage and, said method comprising:

said transporting step comprising operating said conveyor motor and driving said skimmings conveyor and moving galvanizing skimmings from said first chamber, through said conveyor passage and into said second chamber; and

said agitating step comprising movement of a plurality of paddles through galvanizing skimmings on the surface of the molten zinc within said second chamber and into the molten

zinc thus moving ash and free zinc into the molten zinc and melting and recovering the free zinc and leaving the processed ash by-product on the surface of the molten zinc.

3. The method of claim 1, wherein a motor driven rotary agitator shaft having said paddles projecting therefrom is rotated within said second chamber, said method comprising:

substantially continuously rotating said agitator shaft during hot dip galvanizing processing of objects and substantially continuously moving galvanizing skimmings into the molten zinc for recovering free zinc from galvanizing skimmings and producing the refined ash by-product during hot dip galvanizing processing of objects.

4. The method of claim 3, wherein said second chamber of said galvanizing skimmings processor being of elongate configuration and having a skimmings receiving end and a processed ash discharge end and said plurality of paddles being fixed to said drive shaft and angulated for propelling galvanizing skimmings and processed ash toward said processed ash discharge end, said method comprising:

substantially simultaneously agitating said galvanizing skimmings within the molten zinc of said second chamber and propelling said galvanizing skimmings toward said processed ash discharge end at a velocity ensuring recovery of the free zinc from said skimmings and yielding processed ash at said processed ash discharge end; and

said step of removing the processed ash from said second chamber being moving the processed ash through a discharge opening defined in said processed ash discharge end of said second chamber and into a receptacle.

5. The method of claim 1, comprising:

conveying processed ash from said second chamber to a third chamber;

mechanically separating residual zinc particulate from said processed ash; and
depositing said processed ash in a receptacle.

6. The method of claim 5, comprising:

conveying separated residual zinc from said third chamber to said second chamber for further ash separation and zinc recovery within said second chamber.

7. The method of claim 5, wherein said step of mechanically separating comprising:

subjecting ash and zinc within said third chamber to vibratory screening separating ash from zinc particulate;

conducting ash from said third chamber to an ash receptacle; and

returning separated zinc particulate within said third chamber to said second chamber

8. The method of claim 5, wherein said step of mechanically separating comprising:

subjecting ash and zinc within said third chamber to vibratory screening separating ash from zinc particulate;

conducting ash from said third chamber to an ash receptacle; and

returning separated zinc particulate within said third chamber to said first chamber.

9. A galvanizing skimmings processing unit for use during hot dip galvanizing of objects within a galvanizing kettle for recovering free zinc and separating ash from galvanizing skimmings, comprising:

a skimmings processing housing having a first chamber receiving galvanizing skimmings removed from the surface of molten zinc within a galvanizing kettle and a second chamber being separate from said first chamber and adapted to contain molten zinc of the galvanizing kettle therein;

a conveyor passage interconnecting said first and second chambers;

a skimmings conveyor being moveable within said conveyor passage and conveying galvanizing skimmings from said first chamber to said second chamber; and

an agitator shaft being mounted for rotation within said second chamber and having a plurality of paddles supported thereby and defining paddle ends and being of a dimension passing said paddle ends through the molten zinc during each revolution of said agitator shaft.

10. The galvanizing skimmings processing unit of claim 9, comprising:

said skimmings processing housing being defined by side and end walls and being of a dimension such that lower portions of the side and end walls extend into the molten zinc of the galvanizing kettle so that the surface of the molten zinc defines a liquid seal within said second chamber; and

a top wall being disposed in sealed relation with said side and end walls and forming a closure for said second chamber and ensuring against liberation of smoke from said second chamber to the atmosphere.

11. The galvanizing skimmings processing unit of claim 10, comprising:

at least a portion of said top wall being moveable relative to said side and end walls and providing for selective access to said second chamber.

12. The galvanizing skimmings processing unit of claim 10, comprising:

said second chamber of said separator unit being of elongate configuration and defining an inlet region and a discharge region;

said agitator shaft extending longitudinally of said second chamber; and

said plurality of paddles being oriented to impart movement to said galvanizing skimmings along the surface of the molten zinc from said inlet region to said discharge region; and

said housing defining a discharge opening at said discharge region through which processed ash of said galvanizing skimmings is discharged from said second chamber.

13. The galvanizing skimmings processing unit of claim 9, comprising:

a partition separating said first and second chambers;

a tubular conveyor housing of circular cross-sectional configuration extending from said first chamber through said partition and defining a conveyor discharge opening within said second chamber; and

said skimmings conveyor being a helical conveyor establishing a smoke seal within said tubular conveyor housing and preventing smoke within said second chamber from flowing through said conveyor housing to said first chamber and being liberated into the atmosphere.

14. The galvanizing skimmings processing unit of claim 9, comprising:

said second chamber of said separator unit defining an inlet region and a discharge region;

said housing defining a discharge opening at said discharge region through which processed ash of said galvanizing skimmings is discharged from said second chamber;

an ash and zinc separation chamber separating zinc from ash and having a zinc discharge and a refined ash discharge;

a processed ash conveyor receiving processed ash having residual zinc content from said discharge opening and conveying the processed ash to said ash and zinc separation chamber; and

a residual zinc conveyor receiving residual zinc from said zinc discharge and conveying the residual zinc to said second chamber for further zinc recovery processing.

15. The galvanizing skimmings processing unit of claim 14, comprising:

said skimmings conveyor, said processed ash conveyor and said residual zinc conveyor each being tubular conveyors to prevent liberation of smoke into the atmosphere during conveying operation thereof.

16. The galvanizing skimmings processing unit of claim 15, comprising:

rotary drive motors being connected in driving relation with each of said skimmings conveyor, said processed ash conveyor and said residual zinc conveyor and being energized to operator said conveyors.

17. The galvanizing skimmings processing unit of claim 14, comprising:

vibratory screening apparatus being located within said ash and zinc separation chamber and accomplishing screening separation of residual zinc from processed ash and directing refined ash to said ash discharge and directing residual zinc to said residual zinc discharge.

18. The galvanizing skimmings processing unit of claim 14, comprising:

said ash and zinc separation chamber being substantially closed and preventing liberation of smoke into the atmosphere.

19. A galvanizing skimmings processing unit for use during hot dip galvanizing of objects within a galvanizing kettle for recovering free zinc and separating ash from galvanizing skimmings and substantially preventing liberation of smoke into the atmosphere, comprising:

a housing adapted for assembly with a galvanizing kettle and having side and end walls adapted to extend below the surface of the molten zinc of the galvanizing kettle and defining a skimmings processing chamber with the molten zinc of the galvanizing kettle defining a molten zinc surface within said skimmings processing chamber, said skimmings processing chamber having a skimmings receiving region and a processed ash discharge region and having a processed ash discharge opening;

an agitator shaft being mounted for rotation within said skimmings processing chamber and having a plurality of paddles supported thereby and defining paddle ends, said paddles being of a dimension passing said paddle ends through the molten zinc during each revolution of said agitator shaft, said paddle ends being oriented to impart a motive force moving the galvanizing skimmings toward said processed ash discharge region;

a rotary motor having driving relation with said agitator shaft and being energized for imparting driving movement thereto;

an ash and residual zinc separator mechanism located adjacent said separator unit and receiving processed ash from said processed ash discharge opening and accomplishing screening separation of ash and residual zinc particulate from processed ash therein and having a refined ash discharge and a residual zinc discharge; and

a residual zinc conveyor conveying residual zinc particulate from said residual zinc discharge to said skimmings processing chamber.

20. The galvanizing skimmings processing unit of claim 19, comprising:

said ash and residual zinc separator mechanism having an ash and residual zinc separator housing defining a refined ash discharge and a residual zinc discharge;

a processed ash conveyor receiving processed ash from said processed ash discharge opening and conveying the processed ash into said ash and residual zinc separator housing;

a screening assembly being movably mounted within said ash and residual zinc separator housing and receiving processed ash from said processed ash conveyor; and

a screen vibrator being coupled with said screening assembly and imparting vibratory movement to said screening assembly and separating ash and residual zinc and directing refined ash to said refined ash discharge and directing residual zinc to said residual zinc discharge.